

Technological Development in Sawmills and Lumbering along the Pearl River Graham Callaway, 2010

Lumbering was, historically, the most important industry carried out in the Piney Woods region of southern Mississippi. The area was home to vast acreage of longleaf and other pines, as well as other timber, and the exploitation of these resources was for a considerable period central to the economic success of the area. The methods by which trees were converted into finished products saw many innovations over the years, and familiarity with this sequence is important to an understanding of life in historic Mississippi, particularly near large waterways like the Pearl River.

Throughout the history of logging, the same basic tasks were performed using ever more sophisticated methods. Trees suitable for milling had to be located, cut down, transported to the mill, processed at the mill into finished products, and transported to the location at which they would be used. The various technological changes undergone by the industry all relate to one or more of these activities, making them faster, more efficient, or of higher quality.

The earliest exploitation of the region's timber resources was by Native Americans. The favorable environment of the region, including the large quantities of wood, encouraged a very large native population – the largest in the southeastern United States at the time of European contact. (Napier 1985) Exploitation of timber and forest products at the time was performed on an as-needed basis, and the various “milling” tasks were accomplished with relatively simple tools. Trees would most likely have been felled near the location at which they were to be used, and would have been shaped with hand tools. Trees were used to construct dwellings, for food and medicine, and were hollowed out to make canoes. (Mississippi Department of Marine Resources 2005)

European explorers noted as early as 1700 that the tall, straight longleaf pines of the area were suitable for ship masts, and that the area could produce other forest products as well. (Mississippi Department of Marine Resources 2005) It was not until about 1719 that these resources were regularly exploited by colonial powers, and cypress boards and squared timber proved to be the most valuable cash commodity for French Louisiana until sugarcane became profitable in the 1790s. (Napier 1985) Milling operations in these days were small in scale, and, as the Native Americans had done, probably exploited relatively nearby lumber. The most common mill of the day would have been the sawpit. (Cramer 1962) In this arrangement, logs would be squared by hand, placed over a pit or on an elevated trestle, and two men, one on the log and one beneath, would cut boards with a large handsaw. Trees would have been felled by hand, using an axe.

The first Europeans in the region also produced a limited quantity of naval stores, a catchall term for turpentine, rosin, and other products produced from pine gum. (Napier 1985) The early methods for producing these products were, by and large, similar to those used much later: pine trees were “boxed” in winter (had a triangular cavity cut into their trunk), the bark above each box was cut away in spring to allow the flow of gum, and through spring and summer resin was removed from the box with a spade. (Sullivan 2006) This crude gum was processed in a still, usually in the form of a large kettle heated by wood, into turpentine and other products.

In about 1770, sash saws were introduced. A sash saw consisted of a vertical blade in a rectangular frame, which was much more stable than a handsaw and resulted in a straighter cut, though it was still used with a sawpit in much the same way. (Hickman 1962)

Some sawmills were also powered by water. Water powered sawmills had appeared in France and Germany as early as the 1200s or 1300s, and two such mills were built by French colonists near Biloxi in the early 1700s. (Cramer 2003) Mills such as these relied on running water to turn a waterwheel, which, through a gearing system, moved a sash saw or other sawblade up and down. This water power could also have been used to move logs through the saw, but this could also have been performed by other means. These water mills would have included several components: the mill itself, where the waterwheel and saw would be located, a canal from a nearby source of water, including some method for controlling the flow and ensuring a consistent speed of operation, a method of dispersing the water used (often into a swamp or lake), and areas for storing uncut logs and cut lumber. (Fickle 2001) Logs would most likely have been stored in a logpond, and pulled one at a time up a ramp called a “jack-ladder” into the mill for cutting. Cut lumber would most likely have been stacked nearby for drying before being transported for sale, usually by barge or other boat. It would also not have been unusual for such a mill to be a combination sawmill, gristmill, and perhaps other industry. (Cramer 2003) Because of the relatively gentle pace of the Pearl and other rivers in south Mississippi, the area was not well suited to water mills, and reportedly only one of them was operating in the area in 1729. (Moore 1967) In at least a few cases, animal-powered mills, which would have been technologically very similar to water mills, are also known to have been used in the region. (Cramer 2003) Lumbering in these early days was not a year-round enterprise, but was undertaken primarily in the early winter, during the agricultural off-season. Most workers in these mills would thus have been agricultural workers, most of them slaves, rather than lumber specialists. (Moore 1967) Many such laborers would have been rented from their owners during the off season, rather than owned outright by the mill.

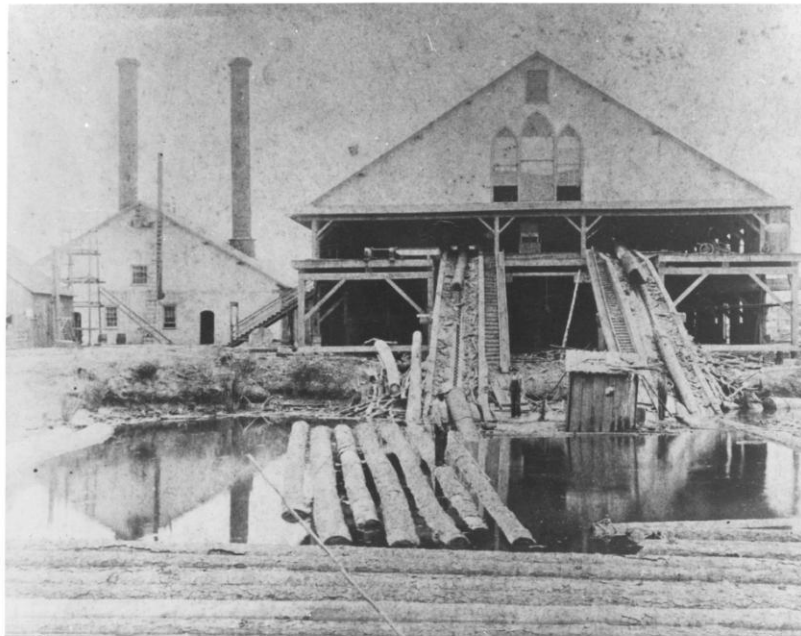
The permanent nature of these mills meant that they could not rely on nearby timber as other methods had. Transportation of lumber in these early days was almost exclusively by water. Trees would be girdled and left to dry, thus ensuring that they would float, and then cut down and assembled into rafts during high water and transported downriver to the mill. (Cramer 2003) In these early log drives, logs belonging to different owners would be stamped with their mark, similar to a cattle brand. Riding these rafts was quite dangerous, and was something of a rite of passage to manhood in the Piney Woods. Many former rivermen later remembered rafting as the most enjoyable job they ever had. (Napier 1985)

Though it is not known exactly when they were first employed in southern Mississippi, gang saws were an improvement on the sash saw not possible using a sawpit arrangement, and they may have been used in the area’s few water or animal mills. Similar to a sash saw, gang saws featured a set of two, three, or four blades parallel to one another, able to convert a log to planks in a single pass. (Cramer 2003)

A major development for the logging industry in the area was the introduction of the steam engine. Though the basic operation of the mill would be similar to that of a water or animal powered mill, a steam mill was far more efficient than either, particularly in light of the low head of water in the area. (Cramer 2003) The first such mill in the region was established sometime in the early 19th century, and by 1840 there were ten of them in Hancock County alone. (Napier 1985) Initially, sash or gang saws would have been used. Steam engines were extremely expensive at the time, so to invest in one was a significant

financial gamble on the part of the sawmill owner, making them somewhat slow to catch on. (Cramer 2003) The steam engines also brought with them new operational needs and new dangers. The engines needed a fuel source (either wood or coal), clear water (which could be obtained from a well, collecting rainwater, or filtering river water), and a set of operators with new specialized skills. (Cramer 2003) The engines could also be hazardous, as boilers could explode, fires could be started, and so on. Many features of the mill layout would be shared with that of a water mill, including the logpond, jackladder, storage area for cut lumber, and central mill building. Transport of uncut logs and finished products was still almost universally by water, so these mills were also located along waterways. However, some different features would occur – substantial foundations of a fireproof material would be required for both boiler and engine, and the greater efficiency of the steam mill would mean that operations could be larger, more industrial, and more automated than had previously been possible. (For example, see Day et al. 1997) It is also interesting to note that this more industrial arrangement meant that specialized equipment was more common, and mills began to include facilities for planing, edging, trimming, etc. Almost all sawmill labor would still have been provided by slaves, though more skilled laborers were required to operate a steam mill and these individuals would most often have been specialists owned by the mill and valued much more highly than agricultural laborers. (Cramer 2003)

See Noyes 1910 for a detailed description of steam sawmill technology.



The Poitevent and Favre steam mill "Big Jim" in Pearlinton in 1890, courtesy Kim Russ

The greater efficiency of the steam mill meant that an increasing amount of timber had to be cut. As the trees convenient to waterways vanished, trees further inland were cut and methods were employed to transport them to navigable water. In some areas, large ditches were excavated in flat, low-lying areas for this purpose, but more common was the use of the "caralog" or "carry-log," a two-wheeled cart usually drawn by four oxen, which lifted one end of the log and allowed the other to drag along the ground. (Mississippi Department of Marine Resources 2005, Napier 1985) Generally, logs would still be rafted

by water to the mill. Oxen were almost universally preferred as the draft animals for lumbering operations in the Piney Woods, because they were better adapted to working in the rough, swampy conditions of the region. (Napier 1985) Commands were given to the oxen by voice, though drivers also carried a leather whip. (Cramer 2003)

The circular saw had been patented in England as early as 1777, but the first one was not used in Mississippi until 1838. (Cramer 2003) There were advantages and drawbacks to the circular saw, but many mills in the region switched over from sash or gang saws in the 1840s and 1850s. (Howe 2002) Circular saws could run at a higher velocity than the older saws, and thus could cut in less time, and they could also produce thinner planks, but cutting pine and other resinous woods with them was problematic because the resin built up in the teeth. (Cramer 2003) Also, a circular saw can only cut logs as thick as half the diameter of the saw, and has a much wider kerf, thus wasting more of each log and producing much more sawdust than the older saws. (Noyes 1910) Nevertheless, they came to be much more common than the various reciprocating saws thanks to their higher efficiency.

In 1847, the new “muley” saw was introduced, which was another improvement on the sash saw. (Hickman 1962) The muley saw used a thicker blade which tapered in cross section, and also eliminated the heavy wooden frame of the sash and gang saw, allowing it to operate at a much higher speed. Though the circular saw remained the more popular, some mills in the region used the muley saw.

Sometime before the Civil War, a slave blacksmith named Usan Vaughn, owned by Nezan Favre of Pearlinton, developed an improved caralog better suited to the swampy conditions of south Mississippi. The original caralog had fairly small wheels and a tread 4 inches wide – Vaughn’s new caralog used a wider tread, and wheels with a diameter of seven feet. (Napier 1985) These new caralogs did not bog down as easily, and could also carry much larger logs. It is not known if Vaughn was rewarded for his invention.



Caralogs, as improved by Vaughn, in Georgia, from Noyes 1910

Following the Civil War, lumbering was one of the first industries in the south to get back on its feet. Many lumbermen were still African-Americans, though there were also increasing numbers of European immigrants and other laborers. (Cramer 2003) Many companies paid in credit at the company store, rather than cash wages. (Napier 1985)

In the late 1870s, spurred in part by incentives offered by the federal government, railroads expanded into the region. This development quickly brought about the end of large-scale transport of timber by water,

as the new railroads were much more efficient. Indeed, the change occurred so quickly that, by 1878, more forest products traveled by rail than by water. (Mississippi Department of Marine Resources 2005) Rail transport also allowed logging, for the first time, to become a year-round industry. (Cramer 2003) The main rail lines through the region were the New Orleans and Northeastern (NO & NE), which ran north from New Orleans through Slidell, Picayune, Poplarville, and farther north, and the Louisville and Nashville, which ran along the coast. Many spur lines and narrow-gauge lines were also built, including one through Pearlinton and Logtown to Picayune, and one from Kiln to points north. (Napier 1985)

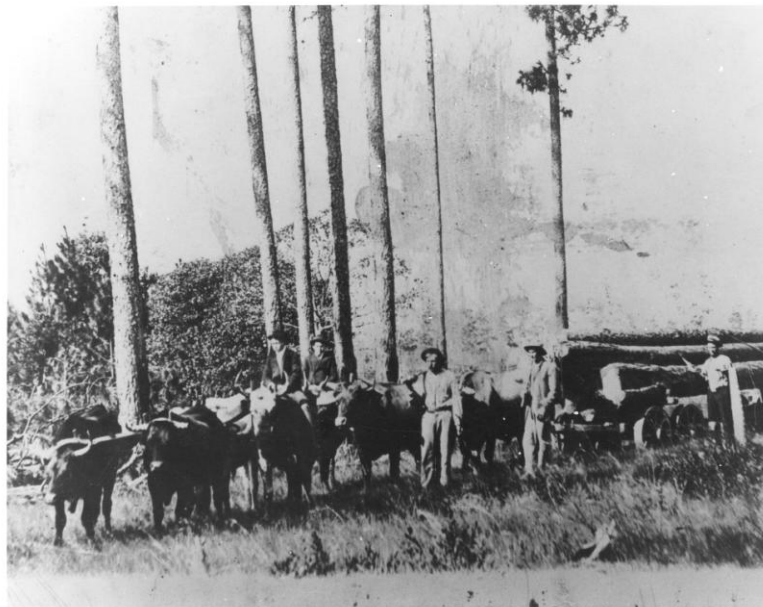
Around the same time, in the 1870s and 1880s, the dry kiln was introduced. This innovation made it possible to process and market the resinous longleaf yellow pine on a large scale. (Howe 2001, Napier 1985)

In the 1880s, the two-man crosscut saw became the preferred method for felling trees, finally replacing the much more labor-intensive method of felling with an axe. (Howe 2001, Napier 1985)

The band saw was patented in France as early as 1834, but does not appear in the United States until 1889. (Cramer 2003) A band saw is a belt of steel with teeth all along one edge, run in a continuous loop around an upper and lower pulley. This allows the speed and economy of a circular saw, but can cut logs of practically any size and allows for more precise cutting. A large number of the old steam mills converted to the new saw, and band saws are still used in many mills today.

As the industry expanded, widespread production of naval stores also began to occur on a large scale. This was most pronounced beginning in the 1880s and 1890s, and hit peak production in the area in 1905. (Mississippi Department of Marine Resources 2005)

In 1905, John Lindsey of Laurel invented a variation on the caralog called the “low boy.” (Napier 1985) The low boy used eight smaller wheels, though it retained Vaughn’s wide tread, and carried logs above rather than below. This machine could move many more logs at one time than a caralog. (Howe 2001)



Logging with a low boy in the Piney Woods.

One of the first “yaryan” plants was built in the area in 1910. These plants produced turpentine and other naval stores from stump wood rather than living trees. (Mississippi Department of Marine Resources 2005) However, the naval stores industry declined precipitously in the early twentieth century, and had practically vanished from the region by 1940.

The first electric sawmill in the region was built in 1913, heralding the beginning of the end for steam power. (Fickle 2001) Slowly but surely, electric, gasoline, and diesel mills replaced the old steam mills. (Cramer 2003) These methods are still used to power mills today.

The First World War created an immense demand for timber, and mechanization of the industry in Mississippi was very rapid during this period. Railroads were expanded and many more spur lines constructed for easier transport of timber, and the old ox teams for collecting logs were largely replaced by the steam skidder, which had been introduced as early as 1901. (Napier 1985) This was a large steam boiler, usually mounted on a railroad car, with one or more large booms like those on a crane. These booms were topped with several pulleys, through which steel cables were fed. The skidder would be set up at a central location, a temporary rail spur usually being built for the purpose, and teams of horses would drag the steel cables out to felled trees as much as a quarter mile away. The logs would be attached, and the skidder would drag them in, tearing down anything in the way and severely damaging the land. (Hickman 1962, Napier 1985) This resulted in the complete deforestation of much of southern Mississippi, since even the small, unmarketable trees which older methods would have left standing were torn down. Indeed, the damage wrought by these machines was so great that some companies, including the H. Weston Lumber Company of Logtown, refused to use them. (Mississippi Department of Marine Resources 2005) Skidders were also extremely dangerous, as logs could become hung up on obstructions, causing them to swing dangerously or cables to snap, either of which could be fatal. (Napier 1985)



A steam skidder in Arkansas, from Noyes 1910

This rapid deforestation meant that the large stands of virgin pine vanished rapidly in the early 20th century, and new methods had to be found to make lumbering in the region profitable. One of the first of these was the discovery that yellow pine could be made into paper, and the Southern Paper Company (which later became part of International Paper) opened its first mill in 1911 at Moss Point to produce paper from the waste products of the L. N. Dantzler mill. (Mississippi Department of Marine Resources 2005)

The disappearance of virgin timber also encouraged companies to begin salvaging “deadhead” logs or “sinkers” – logs that had sunk during the days of river rafting. (Mississippi Department of Marine Resources 2005)

Other methods were also developed to allow forestry to continue in the area. In 1920, William H. Mason of Laurel developed a new method of producing turpentine, and in 1925 the same individual invented Masonite, an artificial board product made from the chips of yellow pine. (Mississippi Department of Marine Resources 2005) Other products produced in the area in the early twentieth century included duck decoys, broom handles, school bus bodies, boxes, creosote, and many others. (Napier 1985, Mississippi Department of Marine Resources 2005)

The various new forest-based industries meant that second-growth timber could now be harvested profitably, and it was in the 1930s and 1940s that that widespread tree planting and forest management began to occur in the region. (Fickle 2001, Howe 2001)

However, the boom time of lumbering in the Piney Woods was over. Most of the large lumber operations in the region closed down or moved to other parts of the country in the 1930s, and it is a much more modest forestry industry which still operates in the region today, mostly producing secondary products such as paper. (Howe 2001, Mississippi Department of Marine Resources 2005)

In the 1950s, transportation of forest products by rail gave way to the more economical and flexible trucking industry. (Mississippi Department of Marine Resources 2005) This is still the primary method by which these products are transported today.

Although the motorized chainsaw had been invented as early as 1926, or perhaps even earlier, it was at first a cumbersome machine which required two people to operate it and was prone to frequent breakdowns. (Thöny 2006) It was not until the 1950s that the one-man chain saw was introduced and the new saws became popular.

Today, logging is heavily mechanized, with a relatively small number of people able to clear land very efficiently with the aid of heavy equipment.

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